

# Modelling Business establishments evolution in Lyon Area, a firmographics approach

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The Land-use transportation integrated modelling has gained an increasing interest in recent years. Using microsimulation methodology on increasingly available disaggregate data helps scientists and professionals to elaborate relevant models to investigate the evolution of urban areas and analyze different policies with respect to the environmental, economical and social sustainability concerns.

In this paper we report the methodology and estimation of a model of the evolution of business establishments in Lyon's region, France. The Lyon urbanized area has experienced a good dynamic of employment market with a yearly growth rate of 1.3% (0.6% for whole France) over the last 30 years. Following a global trend in similar regions, there was an important evolution from manufacturing sectors to services and from retail to hypermarkets. Along with which urban spaces and buildings has been transformed. In very recent years, one also observes some reverse trends as well. The transformation has not occurred uniformly over the area and the services with higher added value were preferably installed in western central parts of the Lyon conurbation, in interaction with higher income population.

The model is going to be integrated in SIMBAD platform. It is a regional LUTI model based on UrbanSim (Waddel et al., 2003). The prospective SIMBAD model (Simulation des MoBilités pour une Agglomération Durable – Mobility Simulation for a Sustainable Conurbation; <http://simbad.let.fr/>) has been conceived at the Lyon labour pool scale to give results on the environmental, economic and social impacts of its traffic. Its main purpose is the simulation of urban planning and transport policies with the perspective of their consequences on sustainable development. It uses logit models to represent household and firm location choice (thanks to the Urbansim tools), the Freturb model for the urban good traffic, a four step model for household traffic, and the Visum model for the assignment step. Freturb needs a more detailed description of establishments to model the freight transportation demand and activities. More detailed activity sectors and geographical units are needed for this part of model.

To construct the model, we use the data of French business establishment's registry for years 1985, 1990, 1999, 2005 and 2011. The datasets are constructed separately and are not intended to be considered as a longitudinal data but thanks to the unique establishment ID code. We use also an extensive building registry to distinguish

In firmographic approach, we extend the methodology presented in Motamedi et al, 2013. There are three main models to estimate: establishment disappearance, establishment workforce evolution and establishment location choice model. The establishment disappearance will be modelled by a binomial Logit. As the workforce is provided by a categorical variable, we propose an ordered Probit

model to represent the workforce evolution. The establishment location choice will be modelled at a first try by a Logit model.

The proposed model takes into account the effects of accessibility, local interaction among establishments of different activity sectors and local population and workers composition on the establishments' evolution and location choice.

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